



ACP Science and Technology Programme

AFS/2009/219015

AFROweeds Project African Weeds of Rice

**Closing workshop of the project AFROweeds
Training in the use of the online database
September 21-28, 2012
Cotonou - Benin**



(© T. Le Bourgeois - Cirad)



Thomas Le Bourgeois – Cirad
Pierre Grard – Cirad
Nora Bakker – Cirad
Alain Carrara – Cirad
Jonne Rodenburg – AfricaRice
Runyambo Irakiza – AfricaRice
Derek Wambulwa Makokha – AfricaRice

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Mission calendar

21/09/2012	20h		CIRAD team arrived in Cotonou
22/09/2012			Preparation of the workshop
23/09/2012	18h		AfricaRice-ESA team arrived in Cotonou
24/09/2012	8h30 – 9h	Workshop with partners	Registration
	9h - 9h30		Opening J. Rodenburg Welcome speech M. Wopereis DDG AfricaRice
	9h30 – 10h		Project overview Cirad T. Le Bourgeois
	10h - 10h30		Project overview AfricaRice J. Rodenburg
	10h30 -11h		Group photo - Coffee break
	11h – 11h15		Questions and answers
	11h15-11h45		Weed identification and information tool <i>Identikit</i> P. Grard Use on iPad tablet
	11h45 – 12h15		Collaborative network <i>Weedsbook</i> D. Makokha and R. Irakiza
	12h15 – 12h30		Questions and answers
	12h30 – 13h30		Lunch break
	13h30 – 14h45		Break-up in 2 working groups (1 English, 1 French) to familiarize with Identikit and Weedsbook
	14h45 – 15h15		General Discussion & Information
	15h15 – 15h30		Coffee break
	15h30 – 17h		Tour around the AfricaRice facilities A. Touré
	17h		Return to hotels
	18h30 – 20h		Cocktail at Hotel du Lac
25/09/2012	8h – 16h	Workshop with partners	Field trip to Kaffa, Zoungo, Agossou (Ouémé Valley) to test weed identification tool on iPad (lunch in nearest town)
26/09/2012	8:30 – 10h30	Workshop with partners	Re-cap of the field visit and general feed-back on weed identification tool
	10h30 – 11h		Coffee break
	11h – 12h30		Round table, conclusions and prospects of the project Official closing of workshop Interviews with journalists
	12h30 – 13h		Lunch break
	13h – 17h		Distribution of iPads Training on iPad use
	17h		Return to hotels
27/09/2012	8:30-12h	Training AfricaRice team	Training AfricaRice assistant and technician on the use of the new online AFROweeds database
	12h-13h30		Lunch break
	13:30 – 17h		Training AfricaRice assistant and technician on the use of the new online AFROweeds database
28/09/2012	8:30-12h	Training AfricaRice team	Training AfricaRice assistant and technician on the use of the new online AFROweeds database
	12h-13h30		Lunch break
27-28/09/2012: Analysis of financial documents AfricaRice third year budget, preparation of the final financial report (N. Bakker, L. Medenilla, G. Maina, A. Sadikou)			
28/09/2012	23h		Departure Cirad and Africarice-ESA teams

Introduction

The AfroWeeds project

The project aims to **create an initial network of partners in West, Central and Eastern Africa, and Europe**, interested in sharing their knowledge on weeds through an online and open-access platform and the creation of a database for the identification and management of major weeds in irrigated and rainfed lowland rice-growing environments.

The mission had two objectives:

- Present and discuss the results and tools of the AFROweeds project and discuss the prospects;
- Training of the AfricaRice team in the use of the new online database

The closing workshop

At the end of the project, the closing project workshop was held for three days in Cotonou, Benin in AfricaRice temporary headquarters, located in Abomey-Calavi, Cotonou, Benin. .



AFROweeds project closing workshop temporary headquarters AfricaRice Cotonou - Benin (© T. Le Bourgeois - CIRAD)

This closing meeting brought together AfricaRice and CIRAD, and weed scientists, extension service providers and botanists from 11 different countries (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Nigeria, Madagascar, Mali, Mozambique, Uganda, Kenya). Various points were presented and discussed:

- Presentation and discussion on the results and tools of the AFROweeds project;
- Training and evaluation of the use of tools with iPad tablets
- Partner feedback on the results and tools

- Discuss the prospects of the project at the end of EU funding

Below, a brief report on the presentations, discussions and activities of this workshop.

Partners

The coordinators of the AfroWeeds project are CIRAD and AfricaRice. CIRAD was represented at the workshop by Thomas Le Bourgeois (weed scientist and project manager), Pierre Grard (expert computer information systems in botany), Nora Bakker and Alain Carrara (research assistant). Note that Pierre Grard left CIRAD in April 2012 to be allocated by the Ministry of Foreign and European Affairs to the French Institute of Pondicherry in India. AfricaRice was represented by Jonne Rodenburg (agronomist), Derek Makokha (research assistant replacing Gerald Kyalo) and Runyambo Irakiza (technician replacing Kobusinge Aloys On the administrative side, Nora Bakker (CIRAD Management Assistant) interacted with George Maina (Head Financial Services), Leny Medenilla (Manager, Budget and Planning), and Sadikou Akram (Accountant) from AfricaRice.

Fifteen national, weed scientists and extension agents of rice development were invited to participate in this workshop but only thirteen could attend. Prof. K. Sibuga from Tanzania and Dr. J.A. Randriamampianina from Madagascar could not come to Cotonou. They all are members of national research structures (agricultural research centers and universities) and are from 11 countries in West and East Africa: Benin, Cote d'Ivoire, Burkina-Faso, Ghana, Mali, Nigeria, Kenya, Uganda, Madagascar and Mozambique or from extension services (Benin, Côte d'Ivoire, Mali, Senegal). Pascal Marnotte represented the French Embassy in Benin. Representatives of the European Union in Benin were also invited but did not attend the workshop.

Researchers and assistants and technicians from AfricaRice also attended the workshop (e.g. Joel Huat, Amadou Touré, Mariame Mariko).

The list of participants is presented in Appendix 1.

Presentations and discussions

The results of the AFROweeds project can be synthesized in three main elements: computational tools, weed information and a weed science network in Africa.

1 Computational tools

A set of tools and computational applications have been developed and published. They are complementary and their combination in the AFROweeds project can meet the different needs of each type of stakeholder (looking for information, sharing document or knowledge, uploading or downloading documents, entering and managing data, contributing to discussions, asking questions, etc.

This set of tools is represented in the fig.1.

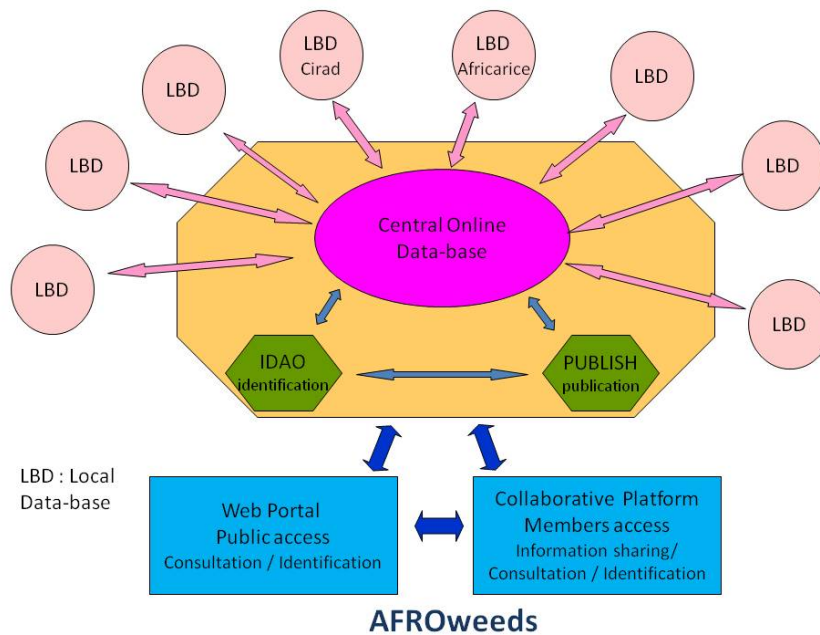
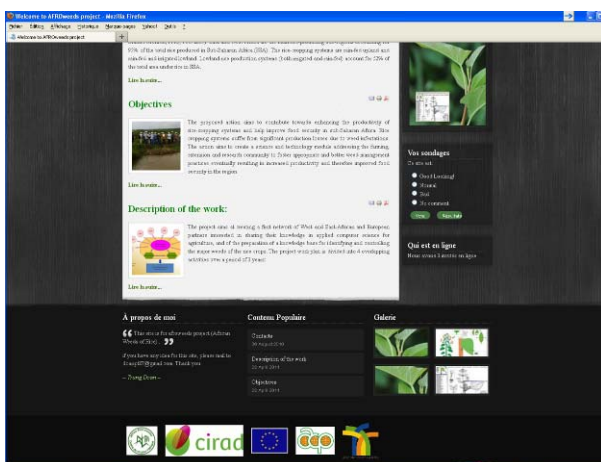


Fig.1 Combination of tools of the AFROweeds project

The project website **Afroweeds** is available at <http://www.afroweeds.org>



Home Page Project website AFROweeds

This website is presenting the AFROweeds project, the various activities (e.g. workshops, missions, techniques used), the project resources (bibliographical, botanical resources, fact sheets on species and identification system), contact of project coordinators and links with the collaborative platform.

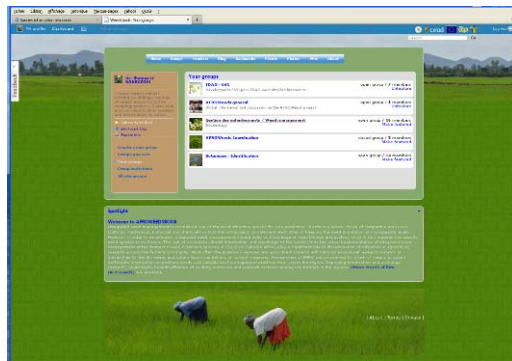
The collaborative platform **Weedsbook** is a Web-2 collaborative space for members of the AFROweeds project available at <http://www.afroweeds.org/network>. It allows to:

- Create working groups on specific topics;
- Share information, working documents, Web links of interest;
- Create, animate and participate to online discussions;
- Supply photo albums (e.g. from missions, weed control practices, unidentified weeds)
- Submit questions or photos (e.g. to identify a weed or to discuss a practice of weeding) to the entire community.

Any page, document or photo can be subject to comments for/from members of the platform. These comments will include the basis for exchanges between the partners.

Participation in this platform requires registration. Registration is validated by the project coordinators to prevent automated registrations or registrations from people with other intentions (e.g. people that are clearly not associated to agriculture or botany). There are currently 133

members registered to the platform. The workshop participants have been trained in the use of this platform and are now able to present it in their professional networks and seek new subscriptions.



Some working groups of the platform



Example of the AFROweeds General group

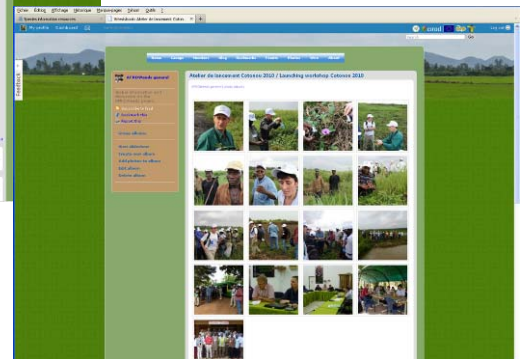


Photo album of the first workshop in Cotonou 02/2010

At present, 11 working groups exist:

- Operation of the project AFROweeds
- AFROWeeds Coordination (closed group limited to the project coordinators)
- Botany and identification
- Tools and methods for identifying IDAO
- Distribution and invasion of regional weeds
- Irrigation network of the Office du Niger
- Management of weed infestations
- Mission at Saint Louis
- Scholarship and R&D grants
- Conferences & Workshops
- Publications

Many scientific papers and a summary of references on the topic of weeds in general and weed control in rice have already been made available to the community.

IDAO identification of weeds using the identikit tool enables the identification of 189 rice weed species at any stage of development or from incomplete samples, without requiring prior knowledge in botany or taxonomy. Moreover, this process is less sensitive to errors than a classical identification-tree, where one mistake can lead to a completely wrong identification.

Species are listed in order of probability of consistency with the information provided by the user.

All the species are fully described in both English and French languages, with information on its origin, distribution, ecology and weediness, control methods used, sources (references), and are abundantly illustrated.

This is a working tool, but also a way for the dissemination of knowledge and a teaching and training tool. It is accessible from the AFROWeeds website from the "Resources" tab; and also from the collaborative platform from the working group "Botany - identification" or the working group "IDAO SVG," or can be used directly at <http://www.afroweeds.org/idao>.

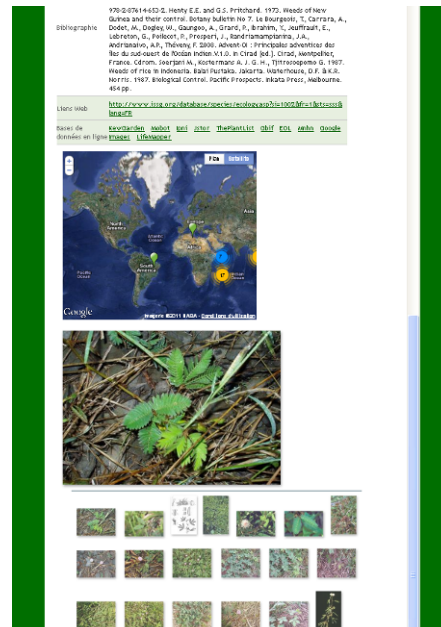
Several versions can be used according to the location, the device used and the internet connectivity:

- A CD-rom is in press for use on computer without internet connection.
- A SVG version is available online for use with computer or iPad with 3G+ or WiFi connection from the website and the collaborative platform of the project.
- An off-line encapsulate version is available for iPad use without 3G+ connection

The screenshots display the IDAO identification software interface. The top-left and top-right screenshots show a plant illustration with a search bar and a sidebar menu. The bottom screenshot shows a table of species with columns for Name, Percentage, and Errors.

Nom d'espèce	Pourcentage	Erreurs
Mimosa pudica	100%	-
Tribulus terrestris	100%	-
Alternanthera nodiflora P.B.	50%	View
Alternanthera cucurbitifolia H.B.K.	50%	View
Alternanthera sessilis (L.) R.Br. ex DC.	50%	View
Amaranthus nudus	50%	View
Bidens pilosa	50%	View
Boerhaavia diffusa	50%	View
Cordia alliodora L.	50%	View
Commelina zambalensis	50%	View
Commelina diffusa	50%	View
Crotalaria coriaria	50%	View
Echinochloa crusgalli	50%	View
Digitaria pruriens	50%	View
Eleusine indica (L.) Gaertn.	50%	View

Several screens of the IDAO identification software



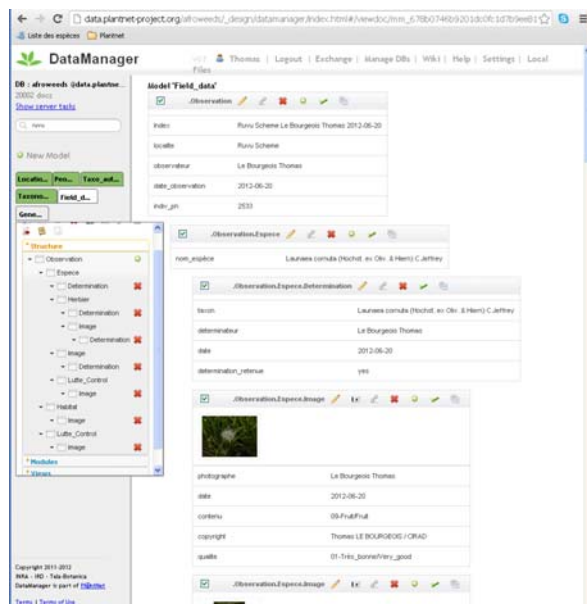
An extract of the information sheet of the species *Mimosa pudica*

The online Database of AFROweeds is now managed using the software DataManager developed by the PI@ntNet project team. This enables online and multi-user data management.

The two previous databases managed by Cirad and AfricaRice are now merged in the same database and accessible by all simultaneously.

It contains four dictionary models (taxonomic, botanical authors, geo-referenced locations, people) and two data models (species generics synthesis, field observations).

In its current state, the AFROweeds database contains 4515 photos and 425 herbarium sheets covering 189 species. The species fact sheets are published in French and in English.



View of a record of the field data model of the AFROweeds online database

2- Weed information system

At the moment the online database, the website and the IDAO identification application contains 189 weed species of rainfed and irrigated lowland rice in Africa. All these species are fully described together with information on their biology, ecology, distribution weediness, control and ethnobotany. Sources of information are also mentioned. All of them are abundantly illustrated by field and herbarium specimen photos.

All the information on these species is available for public consultation on the website of the project, on the collaborative platform or using the identification tool. They are available in both French and English.

This weed information system constitutes a first operational set of information. It will be updated regularly with new information, new species and new languages. For the future it was decided to extend it to upland rice cropping system and to other areas of rice production in the world.

3 African Weed science network

At the 10th African Crop Science Society Conference, a workshop was organized on 'Advancing Weed Research in Africa'. The objective was to assess the need for an African Weed Science Network and to discuss how such a network should operate and how it would relate to other networks or societies with overlapping objectives or geographical ranges. Among the participants of the workshop there was a broadly shared belief that a platform for weed scientists working in Africa, or on African topics, would be useful. The platform could serve to share information, knowledge and contacts and facilitate the organization of events such as workshops and conferences and be instrumental in capacity building and raising more funds for weed research in Africa.

The collaborative platform of the AFROweeds project *Weedsbook* constitutes a foreshadowing of this African Weed Science Network with 133 people already registered. For example, Friday Ekemele a member of the Nigerian Weed Science Society will introduce *Weedsbook* at the 44th annual weed conference coming up November 19-22nd in Nigeria.

Training partners to the use of the identification system on iPad tablets in the field and evaluation of the tools

The second day of the workshop was spent at Zoungo in the Ouémé Valley where workshop participants were trained in the use of IDAO identification and information system using iPads. It was also the occasion to evaluate the performance of the system to identify the species and get information.

The encapsulated offline version of the IDAO identification and information application was installed on three iPads. Teams of three people were composed in the field to practice and to test the system.

For this evaluation, identification duration was timed for 16 different attempts, covering 12 different species.



Evaluation of identification tools on iPads in the field (© A. Carrara / Cirad)

Species	Identification time	Success/failure
<i>Physalis angulata</i>	9.07	F
<i>Emilia sonchifolia</i>	5.02	F
<i>Ageratum conyzoides</i>	4.39	S
<i>Fimbristylis littoralis</i>	3.44	S
<i>Passiflora foetida</i>	1.19	S
<i>Ageratum conyzoides</i>	4.00	S
<i>Bacopa decumbens</i>	3.23	S
<i>Cyperus haspan</i>	6.00	S
<i>Imperata cylindrica</i>	10.16	S
<i>Cyperus distans</i>	8.51	S
<i>Acmela ulinosa</i>	3.20	S
<i>Physalis angulata</i>	3.00	F
<i>Ludwigia octovalvis</i>	2.28	S

<i>Phyllanthus amarus</i>	1.14	S
<i>Ageratum conyzoides</i>	4.36	F
<i>Phyllanthus amarus</i>	9.07	S
Mean	6.34	76%

The mean time taken for identification was 6.34 minutes, with 76% successful identifications showing that the tool is useful for identification of weed species in the field. As none of the evaluators was experienced, it is likely that with a bit more practice the success rate can increase and the time to identification can decrease.

Just following the closing session of the workshop, 17 iPad tablets were offered to the participants. These iPads were configured with the IDAO identification and information application in French or in English depending on the participants, and a direct access to the AFROweeds website.



Ceremony of delivery of iPad tablets (© T. Le Bourgeois / Cirad)

General discussions on the tools (IDAO and collaborative platform)

Discussions were both oral and using the collaborative platform discussion tool. This allowed participants to express their perception of the efficacy and the usefulness of the tools at the same time they train themselves on the use of the discussion system of the platform. Furthermore this session was just a starting point of the discussions which can be continued after the workshop using the collaborative platform.

Discussion on the IDAO identification and information system

It appears from the various comments that the identification tool works well and makes it easy to identify the species, especially broad-leaved weed species. The variations in flower colour within species should however be included. The identification of sedges is more difficult because there are not enough characters that are very accurate. For example the bract length and the characteristics of the bulbs of the sedges should be more specific.

However, the objective of this type of tool is to quickly and easily narrow down to a few species corresponding to the description given by the user. Then the user can read the descriptions and look at the pictures of these different species to complete the identification or at least to exclude some species and narrow down further.

Recommended control methods can be found in documents uploaded to the collaborative platform. To get them, the device must be connected to the Internet. This can be a constraint while in the field. In addition, these recommendations involve groups of species (annual grasses, perennial grasses, sedges, broad-leaved species) and not a particular species.

The weeding methods are stored in documents available from the collaborative platform which facilitates regular updating. It is now up to the members of the platform to expand this tool to other users.

Several stakeholders have requested that new species should be added. Applicants may specify the species they wish to add in terms of their importance. It was also requested to add the names of local species to facilitate discussions with farmers who know the species only through their vernacular names and complete the ethnobotany of these species. They are not only weeds but often provide services such as human food, livestock feed, medicine or green manure among others.

Discussion on the collaborative platform

Most participants indeed felt that the AFROweeds platform Weedsbook should become a platform for an African Weed Science Network. It will help the advancement of weed science in Africa.

This collaborative tool is very efficient as it allows for the sharing of information among members. The question is: will it be perennial? It was suggested that a permanent steering committee be created to maintain the flame. Friday Ekeleme from Nigeria promised to introduce this platform at the 44th Nigerian annual weed conference from 19 to 22 November. Other participants were also enthusiastic about introducing the platform when back to their home countries.

However, language may hinder important discussions on the platform. Is it possible to add a translator to the platform, to give at least a rough idea of what is being discussed?

Queries were raised on whether the tool will be open to any other scientists apart from agronomists and weed scientists, and whether there should be a geographic limitation to Africa. It was indeed suggested that Weedsbook should allow membership from weed scientists working in other crops apart from just rice. On this platform, both scientists and extension people can discuss and share information and questions could really contribute to a sustainable development of agriculture in Africa. It provides an opportunity for African weed scientists to finally find a space for exchange and communication. They now have the opportunity to enjoy this space to initiate collaborative activities and solve weed problems in sub-Saharan Africa.

Extension services will find in this platform a receptacle for the wealth of information gathered in the field, to contribute to the reflections and hope to track possible solutions that do not emanate only from their local expertise, but from the scientific community who are active in the field of weed science.

We believe that the weedsbook is an exposure/training tool, through networking we can learn more about what is done elsewhere as far as weed science is concerned. Therefore, it is important to attract as many members as possible. Weedsbook has the potential to attract young scientists and to motivate them to work on weed problems.

Participants suggested that a consistent notification via e-mail should be established so that they can receive e-mail alerts on 'what is happening' at the platform. They also suggested that the administrators include as the option to "renew" or "reject" membership in order to 'clean' the network from uninterested or otherwise inactive members. It was concluded that this e-mail alert system as well as the membership renewal system could indeed be adopted but that we should keep the e-mail traffic to a minimum to avoid being perceived as spam.

The suggestion was also raised by participants to enhance the AFROweeds tool and database with species already covered by another tool called Adventrop (published by Cirad in 1995). During the workshop it was also mentioned that the translation of the database in other languages such as Portuguese and Swahili should also be considered.

Prospects for continuation of the project after the end of EU funding

All the attendees wanted AFROweeds (i.e. the identification tool, database and Weedsbook collaborative platform) to continue after the end of EU funding. Since the tools are now working well, the partners decided to continue this activity of collecting new data and synthesizing information on weeds in the online database to make it available for consultation by all the stakeholders of rice production systems.

Specific actions were planned:

- Translation of species data sheets in Portuguese for Portuguese speaking countries such as Mozambique and Angola
- Translation of species data sheets in Kiswahili for East African countries
- Extension of the database, identification and information system to weed species of the upland rice systems. (a lot of information already exist in other Cirad databases on weeds of rainfed cropping systems which could be included in the database)
- Extension of the project to other rice production areas such as India, Asia and America where new collaborations can be initiated.
- The collaborative platform (Weedsbook) and associated tools should be used as an African Weed Science Network

Visibility actions

Flyers presenting the AFROweeds project in French and English were distributed to workshop participants so that they can distribute through their professional network in their country.

AFROweeds brochure in English

Interviews with different coordinators or participants were performed by the communication service of AfricaRice and are available online from the home page of the AfricaRice website:

<http://www.africarice.org/>

or directly at

<http://www.youtube.com/watch?v=My8byFC0Vxc&list=PLC8B4BDFC299670AB&feature=plcp>

The news posted on the AfricaRice website has been reposted in other online media already

<http://www.modernghana.com/news/423200/1/experts-launch-tool-for-identifying-major-rice-w.html>

Interviews by journalists of the Benin TV (ORTB) and news papers were also performed.

Training of the AfricaRice team in the use of the online DataManager database

Two days were spent in the presentation of the online DataManager database and in the training of the AfricaRice team to its use. From now on we can all work simultaneously on the same database.

Several aspects were discussed:

- Presentation of the structure of the different models of data (dictionaries and generic species data and field data)
- Consulting information
- Editing and modifying information
- Entering new data

From now, both people from AfricaRice team and Cirad team can work all together on the same online database at the same time. Everybody can access to all the information simultaneously. This online and multi-user database provides a really better potential of data management than the previous one in a context of multi partner project such as AFROweeds.

Administrative aspects of the AFROweeds project

We have first clarify the purpose of the meeting about the management control of the AFROweeds project

It has been agreed to prepare the financial report with expenditures until 31 August 2012. AfricaRice financial manager will then finalize the report with financial expenses from 1 September 2012 to 15 October 2012.

The expenditures shall not be allowed after 15 October 2012. Except the invoice for the printing of CD-Roms. A request for an extension date of the contract until 15 December was sent to the European Commissioner in order to record the invoice for the print of the CD-Roms and to develop and test the version of the identification system AFROweeds for mobilephone (iPhone). Expenses related to the print of the CD-Roms should be recorded under "5.1 Publications."

Dates to send the third report and audited reports were decided as follow:

- 1) October 16, 2012 financial report will be sent by AfricaRice to CIRAD.
- 2) The financial service CIRAD will analyse the financial report of AricaRice and request corrections needed to the financial service at AfricaRice.
- 3) The third report will be provisionally approved by the financial service of CIRAD pending approval by the European Commissioner.
- 4) The financial service of CIRAD will send to AfricaRice the three financial reports (including the first two already approved by the European Commissioner
- 5) These three reports will be audited by the financial auditor of AfricaRice "Ernst & Young". They must be returned to CIRAD for the 1st December 2012.

Conclusions

The final workshop of the AFROweeds project was very interesting and well organised. The attendees were unanimous to say that the AFROweeds project and the tools address an important need for information on weeds of rice in Africa. They are very useful and will facilitate teaching, training and informing rice production stakeholders.

There was a general feeling that this project is not finished but rather just starting. It should be continued and the database as well as the identification and information tools should be extended to new species, new cropping systems and new areas to be more complete and more efficient.

A request to the European Union Commission will be sent for a two month, no-cost extension in order to develop a version of the IDAO identification and information application for smartphone devices and to generate the CD-Roms with this tool and database.

Acknowledgement

The project coordinators of AFROweeds acknowledge Dr. Koichi Futakuchi (Program 2 leader of AfricaRice) for giving an opening speech on behalf of the DG and DDG of AfricaRice, to welcome all participants and present the objectives of the workshop. We thank the European Union (ACP Secretariat -Science and Technology Programme) for funding the AFROWeeds project through the tender of the 2008 9th European Development Fund.

We also thank AfricaRice for hosting the workshop and for the organization of the field trip. In particular we herewith thank Ms. Lucie Dalie for her assistance in preparing this workshop and her availability during the course of it.

Appendix 1: List of attendees**AFROweeds closing workshop – participants list – Cotonou, 24-26 September, 2012**

African NARES Partners	
<i>West Africa</i>	
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